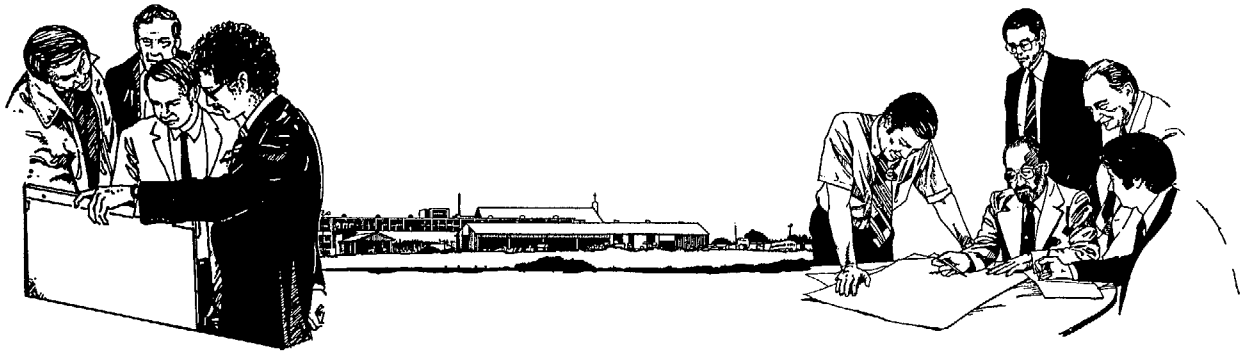


Chapter Five  
DEVELOPMENT ALTERNATIVES

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## Chapter Five

### DEVELOPMENT ALTERNATIVES

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Once the facilities needed for the planning period have been identified, the next step in the master planning process is to evaluate the various ways those facilities can be provided. The possible combinations of alternatives are countless, so some intuitive judgment must be used to identify those alternatives which have the greatest potential for implementation.

Four major functional areas must be considered in the development alternatives at Show Low Municipal Airport. These include the airfield, general aviation terminal area, potential industrial park, and aviation reserve areas. In addition, the utilization of the remaining airport property to provide revenue support for the airport, and benefit the economic development and well-being of the White Mountain Region must be considered.

Each functional area interrelates and affects the development and operation of the others.

Therefore, all areas must be examined both individually, and collectively to ensure the final plan is functional, efficient, as well as cost effective.

When analyzing alternatives for development, consideration must also be given to a "do nothing" or "no build" alternative as well as the possibility of removing aviation services altogether. As these alternatives are not without major consequences and costs to the public, they are also addressed in this chapter.

The alternatives considered are compared using environmental, economic, and aviation factors to determine which of the alternatives will best fulfill the local aviation needs. With this information, as well as the input and direction of the Planning Advisory Committee, a final airport concept can evolve. The final airport concept can then be refined into a realistic and achievable development plan.

## DO NOTHING ALTERNATIVE

This alternative involves maintaining the airport in its present condition and not providing the recommended facility improvements. The major impact of this alternative would obviously be the continuation of the limitations on the use of the Show Low Municipal Airport. This would not only affect the existing users, but also preclude use by larger corporate aircraft. The advantages to this alternative are no additional outlay for capital improvements, and little change in the status quo.

The Do Nothing alternative would restrict the capabilities of Show Low Municipal Airport to accommodate future aviation demands and further enhance the economic development of the region. New demands are being indicated by existing and potential employers in the region that could readily be served by Show Low Municipal Airport. Particularly with the absence of suitable alternate airport sites in the region, the facility requirements indicated in the previous chapter become increasingly important.

A decision to Do Nothing would not only eliminate a portion of the economic potential of the airport, but would also detract from the potential of the entire White Mountain Region. Businesses requiring the use of and services for larger aircraft would look elsewhere, thereby affecting future employment in the region. Potential businesses that are airport related or require regular air transportation would be limited to those businesses that utilize smaller aircraft, thereby eliminating many potential major employers.

In summary, Show Low Municipal Airport has the capability and the potential market to help attract major employment for the area. To choose the Do Nothing alternative would restrict this potential from being maximized to the economic benefit of Show Low, the White Mountain Region and Navajo County.

## SERVICE FROM ANOTHER AIRPORT

The alternative of shifting aviation services to another existing airport was found to be an undesirable alternative due to the limited number of nearby airports having the facilities, capacity, or the development potential of Show Low Municipal Airport.

There is only one other publicly owned and operated airport within a 30 mile radius that can be used by general aviation on an unrestricted basis. Taylor Airport is owned and operated by the Town of Taylor and is developing in order to keep pace with the demands being experienced there. To impose the demands now being met by Show Low Municipal on Taylor Airport would represent an undue burden that could not be absorbed within a reasonable period of time. This would create severe congestion, provide inadequate facilities, result in a significant deterioration in the quality of services, and jeopardize aviation safety.

Further, the convenience of Show Low Municipal Airport centrally located in the White Mountain Region would be lost. Travel times to a large portion of the region would be increased, access to the business and commercial district would be less convenient, and the more popular recreation areas of Pinetop-Lakeside and Sunrise Ski Resort would be more remote.

The air transportation system in the White Mountain Region provides a highly desirable balance in access to aviation facilities and services for most communities in the region. If the services and facilities available at Show Low Municipal Airport were shifted to another airport, this balance would be upset and system efficiency would be reduced. If Show Low Airport were to be abandoned, a major portion of the aviation capabilities and convenience in the region would be lost. Additionally, the flexibility so important in

aviation planning would all but be eliminated. Therefore, transferring services from Show Low Municipal Airport to another airport would not only damage the aviation system but would also hinder the potential for economic development in the region.

## **DEVELOPMENT OF A NEW AIRPORT**

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The alternative of developing an entirely new airport facility in the White Mountain Region to meet area wide aviation demands comparable to those proposed at Show Low Municipal Airport was also considered. This alternative was found to be unacceptable primarily for economic and environmental reasons. Constructing a new airport near an urbanized area can be a very difficult, time consuming, and costly undertaking. The development of a new airport requires a tremendous financial commitment of public funds for land acquisition, site preparation, and construction.

In addition, the closing of Show Low Municipal Airport would mean the loss of a major investment in a facility that can still be expanded and effectively utilized. In a case where public funds are limited, the replacement of a facility that can easily be improved is an unjustifiable loss of taxpayer dollars. Further, if the existing airport were to cease to be used for airport purposes, title to the property would revert to the U.S. Government. The land could not be sold or developed to offset the land acquisition costs of a new airport.

From the social, political, and environmental standpoints, the commitment of a new large land area must also be considered. In the past twenty years, there has been significant opposition to the development of new airports. This is due to the fact that new airports require the purchase of large tracts of property and can have an adverse impact on

the environment. Furthermore, the development of a comparable airport would take at least ten years to develop, and would not solve existing deficiencies or meet the short-term needs of the existing traffic.

The location of a new airport would likely be much less convenient than the existing Show Low Municipal Airport. The existing airport is centrally located in the region with easy surface access from all directions. No other potential airport site could provide a more direct surface route to the other communities in the White Mountain Region.

Although the existing airport is somewhat constrained in terms of providing optimum runway length, the existing airport can be developed to safely and efficiently accommodate all anticipated and most potential aircraft that may desire to use Show Low Municipal Airport. Therefore, replacing Show Low Municipal Airport was not considered to be a feasible and prudent alternative in this case.

## **AIRPORT DEVELOPMENT ALTERNATIVES**

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The previous chapter identified both the airside and landside facilities necessary to satisfy forecast demands through the planning period. The overall objective is to produce a balanced airside and landside complex to serve forecast aviation demands. However, prior to defining and evaluating specific alternatives, development objectives for the evaluation should be identified.

The City of Show Low provides the overall guidance for the operation and development of Show Low Municipal Airport. It is the responsibility of city government to market, develop, and operate the airport to the betterment of the City of Show Low and the

White Mountain Region. This responsibility is best served when city and airport management focus on the following objectives:

- ♣ Obtain the maximum amount of air service possible for the community.
- ♣ Operate the airport as an attractive, efficient, safe, and environmentally compatible facility.
- ♣ Market and develop the airport facilities and available land as unique economic development opportunities.

In attempting to meet these objectives, development of facilities should be undertaken in such a manner as to minimize operational constraints. Flexibility in airport development is essential to assure adequate capacity and minimize financial commitments until market potential is realized.

## DEVELOPMENT CONCEPTS

Airside facilities are by nature the focal point of the airport complex. Because of their primary role and the fact that they physically dominate airport land use, airside requirements are the most critical factors in the identification of reasonable airport development alternatives. In particular, the runway and taxiway system will have the greatest effect on terminal building, aircraft parking apron and navigational aids.

The development of airside alternatives examined various ways that the recommended airside facilities could be provided. The various airside alternatives attempted to maximize the utilization of existing facilities, provide maximum crosswind coverage of the runway system, and provide maximum runway length within reasonable topographic, engineering and cost constraints.

The development concepts resulted in the analysis of four airside alternatives that concentrated on achieving the optimum for at least one of these goals. It should be noted that many of these goals are mutually exclusive; that is attaining one goal can only be achieved at the expense of another, and that "trade offs" are inherent in the analysis of these alternatives.

For each airside alternative that was considered it was necessary to also examine the landside development that would be needed. Depending on the extent to which the runway system changes the existing landside facilities could be rendered inefficient or unusable. Show Low Municipal Airport is fortunate in that a large portion of the long term landside facility requirements already exist. Every effort was made to make maximum use of existing landside facilities without compromising safety or the operational integrity of the airport.

The previous airport master plan conducted in 1979 recommended that Show Low Municipal Airport be developed to ADG II and Approach Category B standards. Since that time the importance of general aviation, and the size and sophistication of the general aviation aircraft fleet has grown significantly. It is now recommended that Show Low Municipal Airport be developed to ADG III and Approach Category C standards.

By upgrading to the more stringent design standards, several design deficiencies will be created that will need to be rectified. Principle among these are the separation standards for runway centerline to airport property line and building restriction line. The existing separation is 500 feet, which will need to be increased to 750 feet. The Runway 6-24 centerline to parallel taxiway centerline separation will need to be increased from 240 feet to 400 feet, and the aircraft parking limit line will increase from

250 feet to 500 feet from the centerline of Runway 6-24.

### Alternative A

Alternative A is an examination of the previous master plan concept in view of the updated information contained in this Master Plan. In this alternative the existing runway system is retained and the future airside and landside facility improvements are incorporated into the existing airport layout. This alternative utilizes the existing airside and landside facilities to the maximum extent possible. Exhibit 5A illustrates the proposed runway development associated with Alternative A.

Runway 6-24 would be extended to 7,200 feet in length, widened to 100 feet and strengthened to accommodate aircraft weighing up to 60,000 pounds. Runway 3-21 would be widened to 75 feet in width, however this runway could not economically be extended much beyond its present length of nearly 4,000 feet. The additional landside facility requirements would be provided by continuing the present pattern of development.

Runway 6-24 can be extended a maximum of 1,000 feet to the west without relocating Highway 77. Extending Runway 6-24 to the east is possible but would require a substantial amount of earth fill to construct runway and taxiway extensions, and provide the necessary safety areas. An additional 200 feet of asphalt could be constructed on the east end of Runway 6-24 without major earthwork to provide the 7,200 foot desired length, however, whether or not this short extension would be cost effective would be determined during the design of the 1,000 foot extension to the west.

Adequate Runway Safety Areas must be provided for each runway at the airport.

Runway Safety Area standards vary with the type of aircraft the runway is intended to accommodate. Runway Safety Areas for ADG II and Approach Category B aircraft are 150 feet wide and extend 300 feet beyond the end of the runway. Runway Safety Areas for ADG II and Approach Category C aircraft are 500 feet wide and extend 1,000 feet beyond the end of the runway.

Runway 6-24 is ultimately planned to accommodate the larger aircraft and will require the larger safety area. The standard Runway Safety Area can not physically be provided in a conventional runway configuration, therefore, Runway 6-24 will have displaced thresholds in order to provide the necessary safety area. The displaced thresholds will reduce the landing distance available by the amount of the displacement, however, the takeoff distance available will not be reduced. The amount of runway length behind the displaced threshold is usable runway for takeoff and for landing rollout for landings from the opposite direction.

The extension and widening of Runway 6-24 required in order to upgrade to ADG II and Approach Category C standards will require the acquisition of additional land for Runway Protection Zone and Runway Safety Areas. The Runway Protection Zones extend 1,900 feet beyond the runway ends and are 1,510 feet wide at their outer limits. Land acquisition will also be necessary to control land use out to the Building Restriction Line (BRL) which will increase to 750 feet from the runway centerline. The total land acquisition required for Alternative A would be approximately 164 acres.

The land acquisition requirements for improving Runway 6-24 will extend west across Highway 77 and include approximately 45 acres. This land may not be practical to purchase outright in which case an aviation easement combined with proper zoning

restrictions can assure the necessary property interest and safety considerations. Almost all the land to be purchased is U.S. Government land that is administered by the U.S. Forest Service. The parcel south of U.S. Highway 60, and the small parcel along the eastern side of Section 17 for the Runway 6 Runway Protection Zone are privately held.

The analysis and consequences of improving Runway 6-24 just discussed relative to Alternative A are common to Alternatives B and C as well. These consequences should be considered equally for all three alternatives. The above discussion will not be repeated for Alternative B or C since the consequences will be the identical. The analysis of the other alternatives will focus on the unique or varying aspects of each alternative and will be compared to each other.

As mentioned earlier, Alternative A attempts to make maximum use of the existing facilities and develop the runways to the recommended length, width, and strength. Runway 3-21 is currently 3,920 feet in length and could easily be extended to 4,000 feet, or slightly longer. This runway length is considered to be an absolute minimum crosswind runway length, while 5,600 feet is recommended where feasible.

It may be possible to extend Runway 3-21 to the northeast, however, extensive amounts of earth fill would be required to meet grade limitations and the runway would then extend into Long Lake. Long Lake is currently a dry lake bed, however, the lake does periodically fill and store water for long periods. Extending Runway 3-21 would require altering the current shoreline of the lake and may have adverse environmental consequences. The potential environmental effects of the proposed airport development will be discussed later in the Master Plan Study.

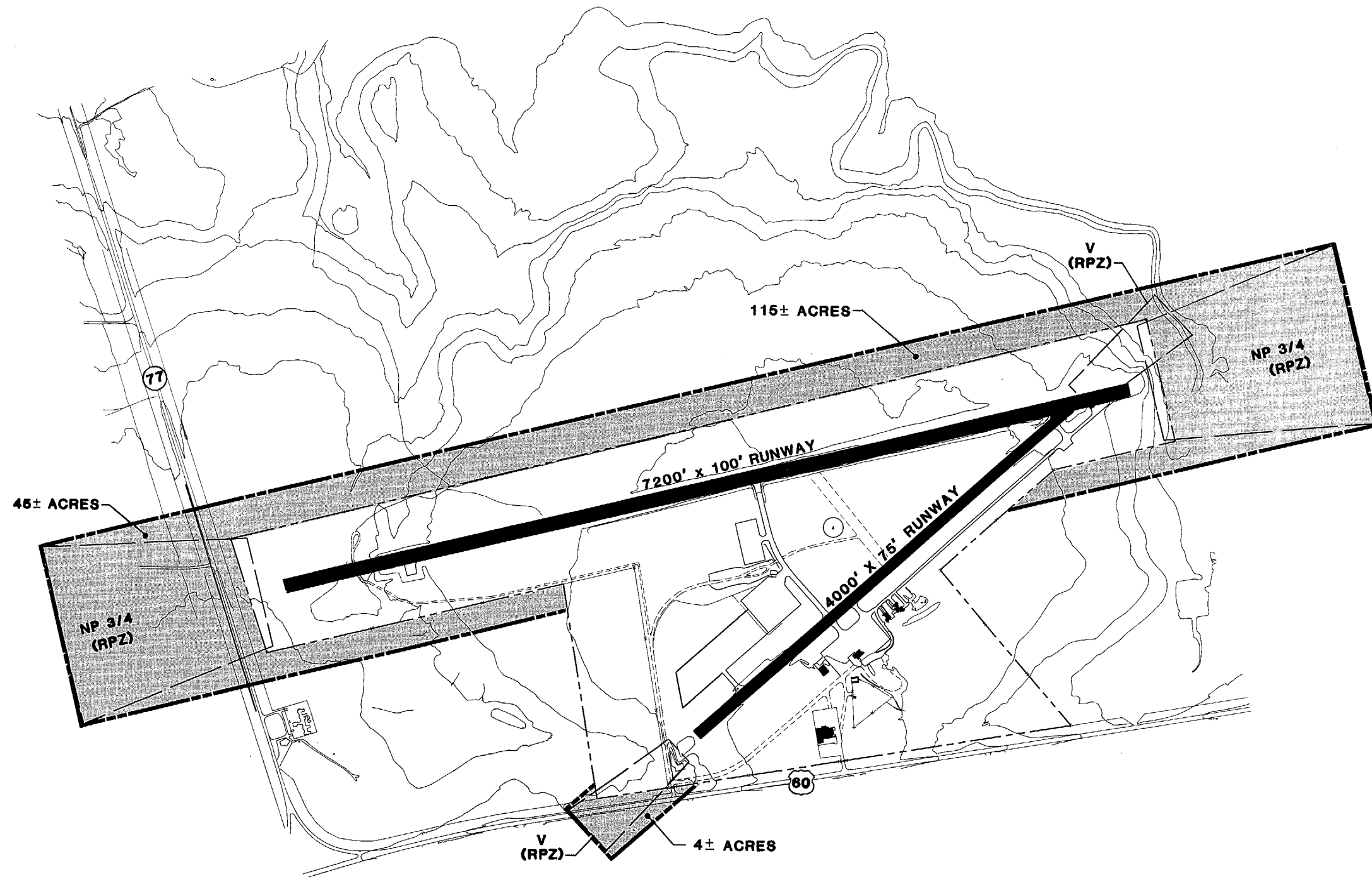
Runway 3-21 should be planned to meet ADG II and Approach Category B standards.

These standards require a runway centerline to taxiway centerline separation of 240 feet. The existing separation between the centerline of Runway 3-21 and Taxiway 2 is 181 feet.





Numerous portable T-hangars and one large permanent hangar are located to within 250 feet of the centerline of Runway 3-21. These hangars would have to be relocated in order to reconstruct Taxiway 2 at the standard 240 foot distance from the runway. Since Taxiway 2 is used by the larger aircraft to taxi to Runway 6-24, this deficiency is more serious. When a full length parallel taxiway is constructed for Runway 6-24 this deficiency will be reduced but can not be eliminated.

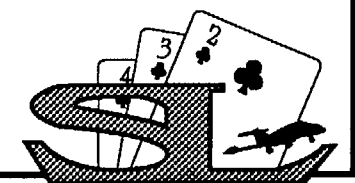
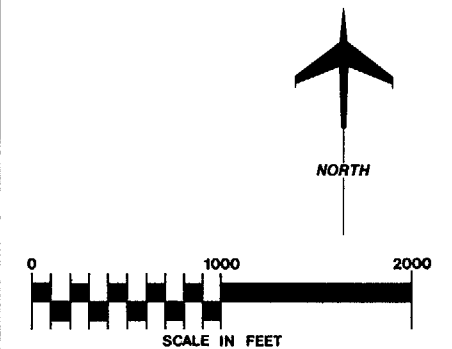
Given the additional land acquisition requirements and the relatively high construction costs, it is doubtful that a significant extension of Runway 3-21 is feasible. In addition, the crosswind coverage provided by the two existing runways does not achieve the desired 95 percent crosswind coverage. Runway 6-24 and Runway 3-21 combined provide 90.7 and 93.7 percent coverage for 12 m.p.h. and 15 m.p.h. crosswinds respectively. Combine these factors with the fact that Runway 3-21 is the crosswind runway, rather than the primary runway, and a 1,600 foot extension can not be considered a cost effective option.

Alternative A would retain the existing aircraft traffic pattern and aircraft noise characteristics of the airport. Traffic patterns would remain on the north side of Runway 6-24 and on the southeast side of Runway 3-21. Aircraft noise is expected to remain insignificant with the possible exception of an occasional single aircraft operation. A detailed analysis of the existing and future aircraft noise exposure will be conducted in the Environmental Evaluation chapter of this Master Plan.



LEGEND:

-  Property Aquisition
-  Runway Protection Zone (RPZ)
-  Visual Approach
-  Non-Precision Instrument Approach – Visibility minimums as low as 3/4mile



**Show Low**  
MUNICIPAL AIRPORT

Exhibit 5A  
ALTERNATIVE A AIRSIDE DEVELOPMENT



Alternative A), this alternative would develop a new crosswind runway oriented northwest/southeast. This runway, Runway 13-31, would be 5,600 feet long and 75 feet wide. However, it should be noted that the terrain for the northernmost 500 feet of this runway drops off sharply and would require substantial earth fill to meet grade requirements. If the costs of providing this fill material become excessive, approximately 5,100 feet of runway could be constructed with a minimum of additional fill which would make 5,100 feet a more feasible, cost effective and acceptable crosswind runway length.

The crosswind coverage provided by Runway 13-31 would be 90.3 percent for 12 m.p.h. and 93.5 percent for 15 m.p.h. crosswinds. Combine this with the wind coverage provided by Runway 6-24 and the two runways together could provide 91.9 and 95.1 percent crosswind coverage for 12 m.p.h. and 15 m.p.h. respectively. Runway 13-31 is oriented more directly into the stronger winds (20+ m.p.h.) out of the south as indicated by the greater crosswind coverage. In addition to the greater wind coverage, the one percent uphill grade to the south will also serve to reduce landing distances and tend to make 5,100 feet of runway an acceptable crosswind runway length.

Construction of Runway 13-31 will require the acquisition of an additional 48 acres of land north of the land that is needed for the development of Runway 6-24. This land includes a small portion of Long Lake. However, the area of Long Lake would not be needed for runway construction and would only be used for Runway Protection Zone purposes. The total land acquisition for Alternative B would be approximately 218 acres.

Alternative B has the additional option of retaining Runway 3-21 which would provide even greater crosswind coverage. However, retaining Runway 3-21 would also increase

development costs, maintenance costs, and tend to restrict landside development and is not recommended. Without Runway 3-21 there is approximately 123 acres available for terminal area development. With Runway 3-21 this area is reduced to approximately 91 acres. Exhibit 5D illustrates the terminal area development associated with Alternative B.

Development of Runway 13-31 would require the relocation of the portable T-hangars along the east side of the south aircraft parking apron. These T-hangars could be relocated onto the south apron or absorbed into the recommended T-hangar development along Taxiway 1. However, this T-hangar development could not occur in the proposed location if Runway 3-21 is retained. These T-hangars would violate the Runway Visibility Zone.

As in Alternative A, the terminal building and auto parking would remain essentially in its present location. However, the FBO and fuel facilities would be located along the south edge of the north parking apron. The north parking apron would be extended to the west and the entire apron would be strengthened to accommodate aircraft weighing up to 60,000 pounds. This additional apron would provide the necessary transient aircraft parking and airline gate positions.

Locating the FBO adjacent the north apron would better enable the FBO to attract and service the larger corporate aircraft and the majority of activity on Runway 6-24. Fuel access and convenience would be improved not only from the apron but also from the entrance road for deliveries. Fuel tanker trucks would not need to mix with other terminal traffic.

The development of Alternative B would result in changes to the airport traffic patterns and alter the aircraft noise exposure pattern. The traffic pattern for Runway 3-21 would be eliminated and the traffic pattern

The future landside development requirements of this alternative would be incorporated into the existing development pattern. The existing pattern is well suited to the runway configuration and would allow almost complete utilization of existing facilities. The one exception would be the loss of a portion of the north parking apron that would be located within 500 feet of the centerline of Runway 6-24. The area that this apron occupies would be needed for parallel taxiway construction and taxiway safety area. The north apron would be extended to the west to compensate for the loss of parking apron capacity and provide for future parking requirements. Exhibit 5B illustrates the terminal area development associated with Alternative A.

The terminal building and auto parking would remain essentially in its present location but would be expanded to alleviate current deficiencies and meet future needs. The terminal building is located between the runways and provides direct access to two of the three parking aprons. The existing terminal building would be expanded (or replaced) from its current area of 760 square feet to at least 3,500 square feet to meet the general aviation requirements.

When scheduled commercial passenger service is established at Show Low additional terminal space will be required. The airline terminal facilities should be aligned more closely with the north apron and Runway 6-24. The additional space and facilities may be separate from the general aviation facilities or combined. If the facilities are combined, then the facilities and services more unique to their respective markets should be located at opposite ends of the terminal building with the common facilities in the middle.

The north parking apron will need to be strengthened in order to provide the airline gate positions adjacent the terminal building. The north apron will also be used for the

heavier transient aircraft. The center apron should be used for local aircraft in open tie-down parking and for FBO services to smaller transient aircraft.

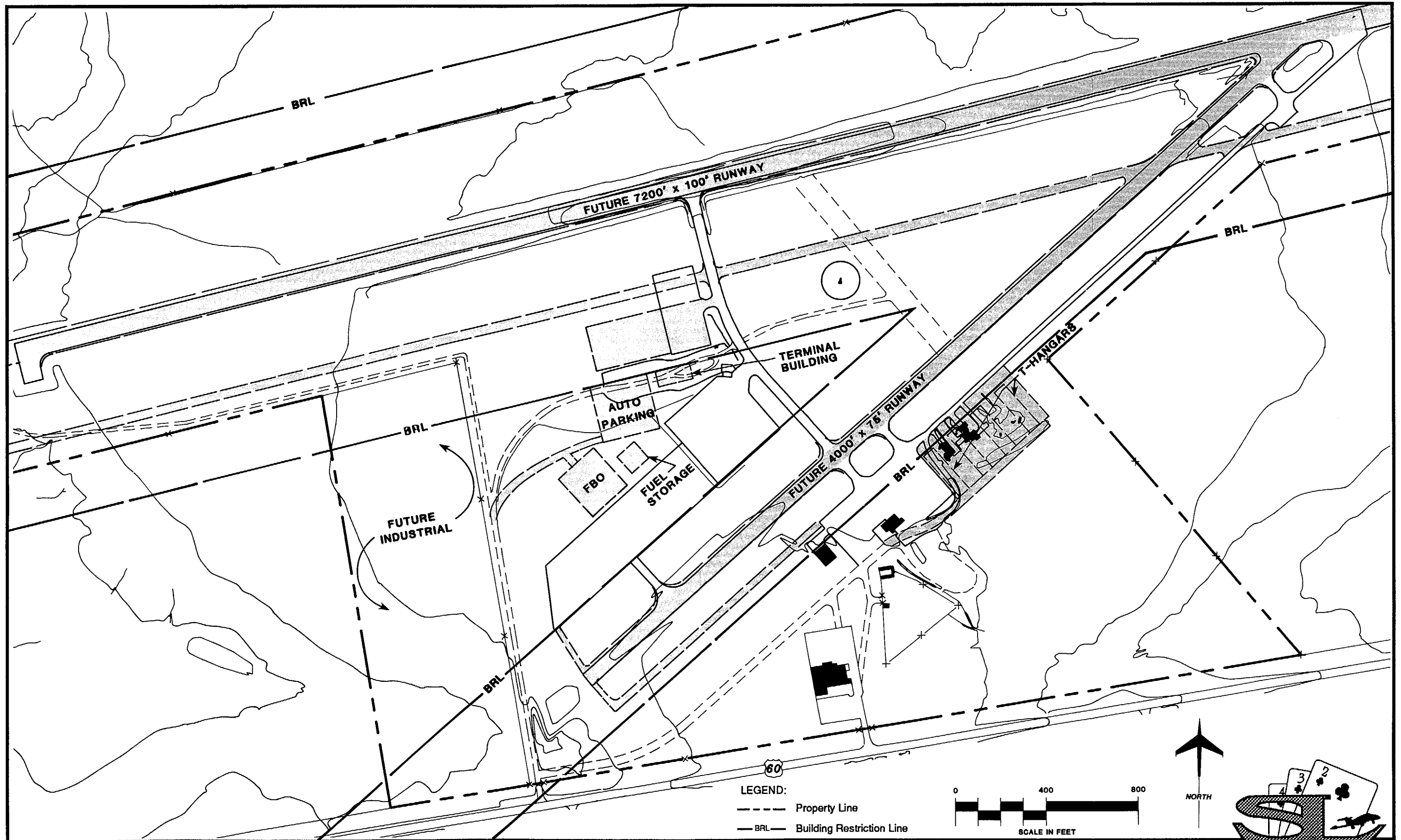
T-hangar storage will continue to be provided on the south side of Runway 3-21. Ideally these facilities should be in the same area as the other terminal facilities to minimize runway crossings. However, there is not enough area to conveniently locate these hangars between the runways. In addition, development of hangars between the runways would reduce the visibility from one runway to the other.

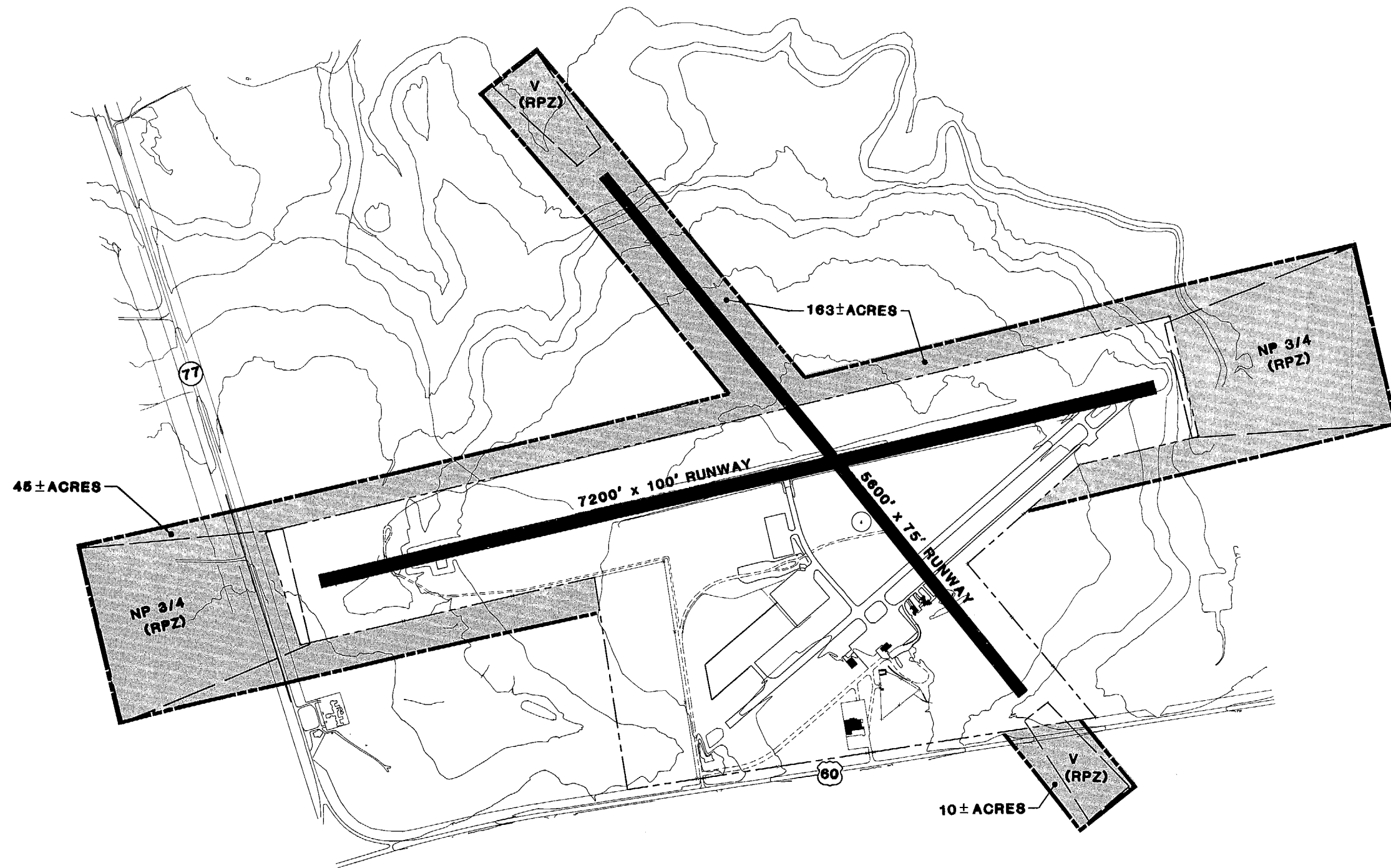
The costs of development of Alternative A would be the least of any of the alternatives. The existing landside development would remain well aligned (parallel and perpendicular) with the runways and taxiways which would contribute to safety, efficiency and convenience. However, Alternative A can not achieve the 5,600 foot recommended crosswind runway length or the desired wind coverage. In addition, Alternative A would have uncorrected design deficiencies which can not meet the planning criteria selected for Show Low Municipal Airport.

#### Alternative B





Alternative B seeks to improve the crosswind coverage of the runway system with a minimum of impact on the existing landside development. This alternative considers developing a new crosswind runway in the same location and orientation as the previously abandoned cinder strip. The existing crosswind runway (Runway 3-21) would no longer be required and should be abandoned at some point in the future. Exhibit 5C illustrates the runway development associated with Alternative B.

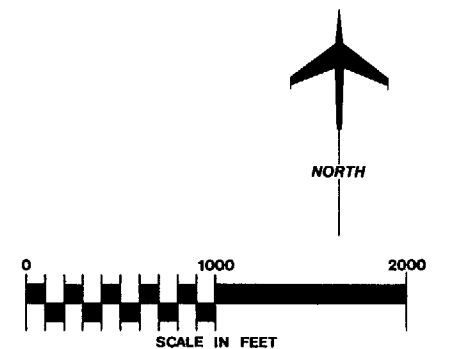
In addition to the recommended improvements to Runway 6-24 (same as

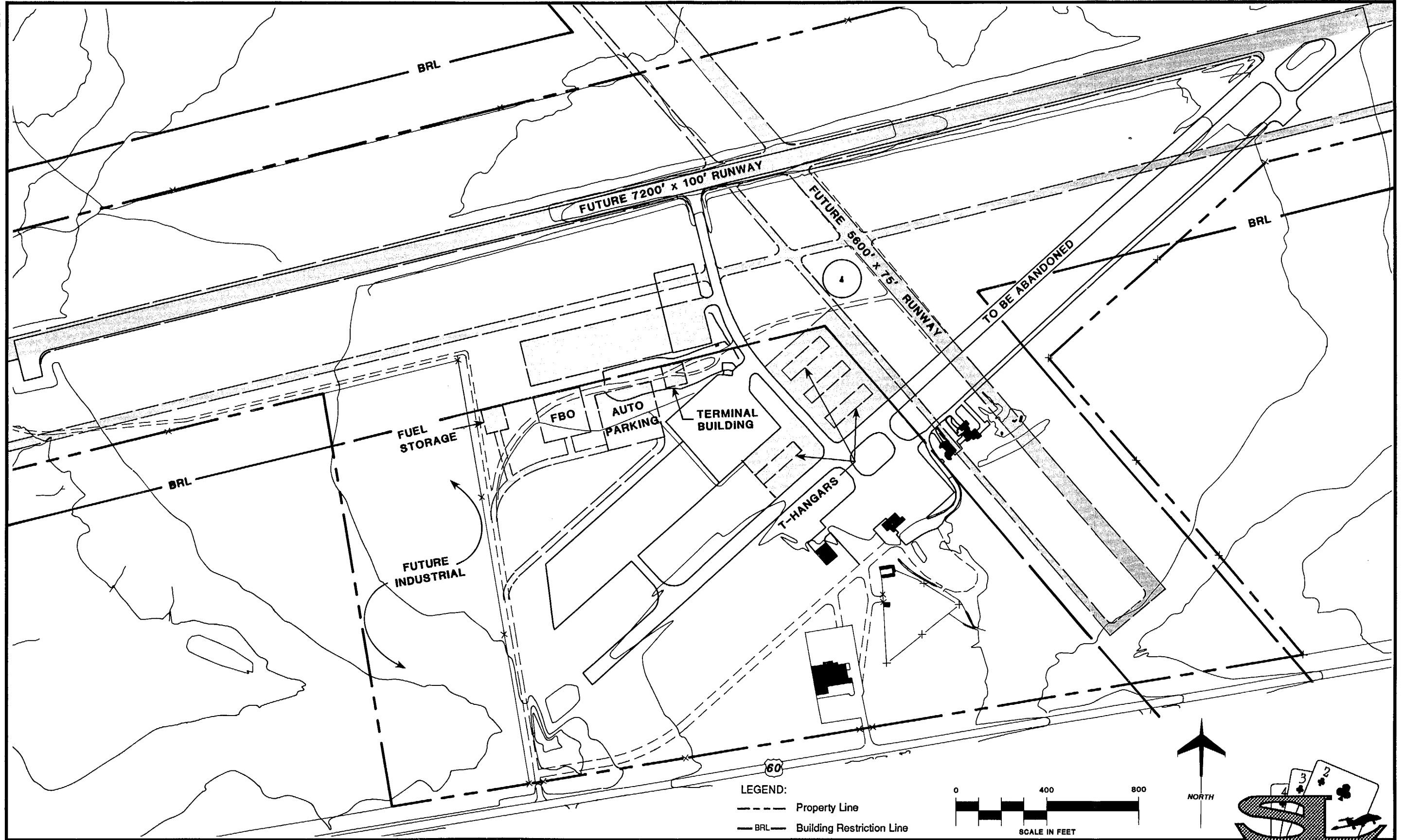




LEGEND:

-  Property Aquisition
-  Runway Protection Zone (RPZ)
-  Visual Approach
-  Non-Precision Instrument Approach – Visibility minimums as low as 3/4mile





for Runway 6-24 would remain unchanged. Standard left hand traffic should be established to Runway 13-31 even though traffic to Runway 31 would be nearer the residential areas west of the airport. The presence of First Knoll approximately where right hand traffic to Runway 31 would turn from downwind to base would represent a potential hazard. Alternative B could also result in a slight improvement in aircraft noise exposure since traffic departing on Runway 21 and arriving on Runway 3 which currently passes over residential areas would be eliminated.

The development costs of Alternative B would be greater than Alternative A since a new 5,600 foot runway would need to be developed. In addition the terminal area would become less efficient and less convenient. The facilities that are aligned with Runway 3-21 would become more remote from the runways and taxi distances would be increased. The positive aspect of this terminal area layout is that eventually the south apron could be connected to the center apron and runway crossing would be eliminated.

### Alternative C

Alternative C seeks to maximize crosswind coverage of the runway system while providing the desired crosswind runway length of 5,600 feet. This alternative accepts the reduced utility of the existing and potential landside development in favor of a runway orientation that provides greater crosswind coverage. Alternative C proposes to develop Runway 6-24 the same as in Alternatives A and B. Again, the existing crosswind runway (Runway 3-21) should be abandoned to enable future terminal area expansion. Exhibit 5E illustrates the proposed runway development associated with Alternative C.

Based on the 1989 wind observations recorded at the airport, the optimum wind coverage for Show Low Municipal Airport would be achieved by a runway oriented on a true bearing of 006/186 degrees. A runway orientated in this direction would provide 97.6 and 98.6 percent coverage for 12 m.p.h. and 15 m.p.h. crosswinds respectively. One year of wind data is the minimum upon which to base a decision on runway orientation. Annual variations in wind patterns are common, therefore, additional data should be collected and tabulated to increase the reliability of the wind analysis.

A crosswind runway oriented on a bearing of 006/186 may not be the most feasible orientation due to topographic, engineering and construction cost considerations. Therefore, a runway aligned as closely as possible to the optimum orientation, and capable of meeting grade requirements with a minimum impact to the existing landside development was selected.

A runway oriented on a true bearing of 024/204 degrees (Runway 1/19) would provide 95.7 and 97.5 percent coverage for 12 m.p.h. and 15 m.p.h. crosswinds. The combined crosswind coverage provided by Runway 1-19 and Runway 6-24 would be 96.6 percent for 12 m.p.h. winds and 98.2 percent for 15 m.p.h. winds. Runway 1-19 alone would meet the 95 percent minimum crosswind coverage recommended by the FAA. However, it would not be practical to construct Runway 1-19 to 7,200 feet in length, therefore Runway 6-24 would still be required to provide the necessary runway length.

The proposed crosswind runway orientation of this alternative also takes advantage of a natural ridge that extends north from the airport. This 5,600 foot runway would require a minimum of fill material on the north end to maintain grade limitations and could be constructed at nominal construction costs.

Construction of Runway 1-19 would require acquisition of approximately 57 acres north of the land already needed for Runway 6-24. This land would include a portion of Long Lake for Runway Protection Zone purposes. No runway construction would be required within the existing shoreline of the lake. The total land acquisition required for Alternative C is approximately 224 acres.

The previous Master Plan identifies a 34 acre tract on the west side of the existing airport entrance road for future industrial development. The development of Runway 1-19 would require the use of the majority of this parcel for runway, taxiway, safety area and protection zone. Only ten acres of land in two triangular parcels would be left for potential development. These two parcels would be rendered essentially unusable for industrial purposes and no other area on the existing airport could be used for non-aeronautical industrial purposes.

As with Alternative B this alternative also presents the option of retaining Runway 3-21. However, unlike Alternative B the terminal area would now be essentially enclosed within a triangle formed by the three runways thereby limiting future development. Given the crosswind coverage and runway length provided by Runway 1-19 and the maintenance costs associated with retaining Runway 3-21, this option should be discouraged.

The proposed landside development associated with Alternative C is illustrated in Exhibit 5F. When runway 3-21 is abandoned there will be approximately 132 acres available for landside development. The terminal building and auto parking would remain adjacent to the north apron. The north parking apron would be expanded, however, the presence of Runway 1-19 would limit extension to the west. FBO and fuel facilities would be developed adjacent to the center apron. The existing portable T-

hangars could remain in their present location or they could be incorporated into the future T-hangar development.

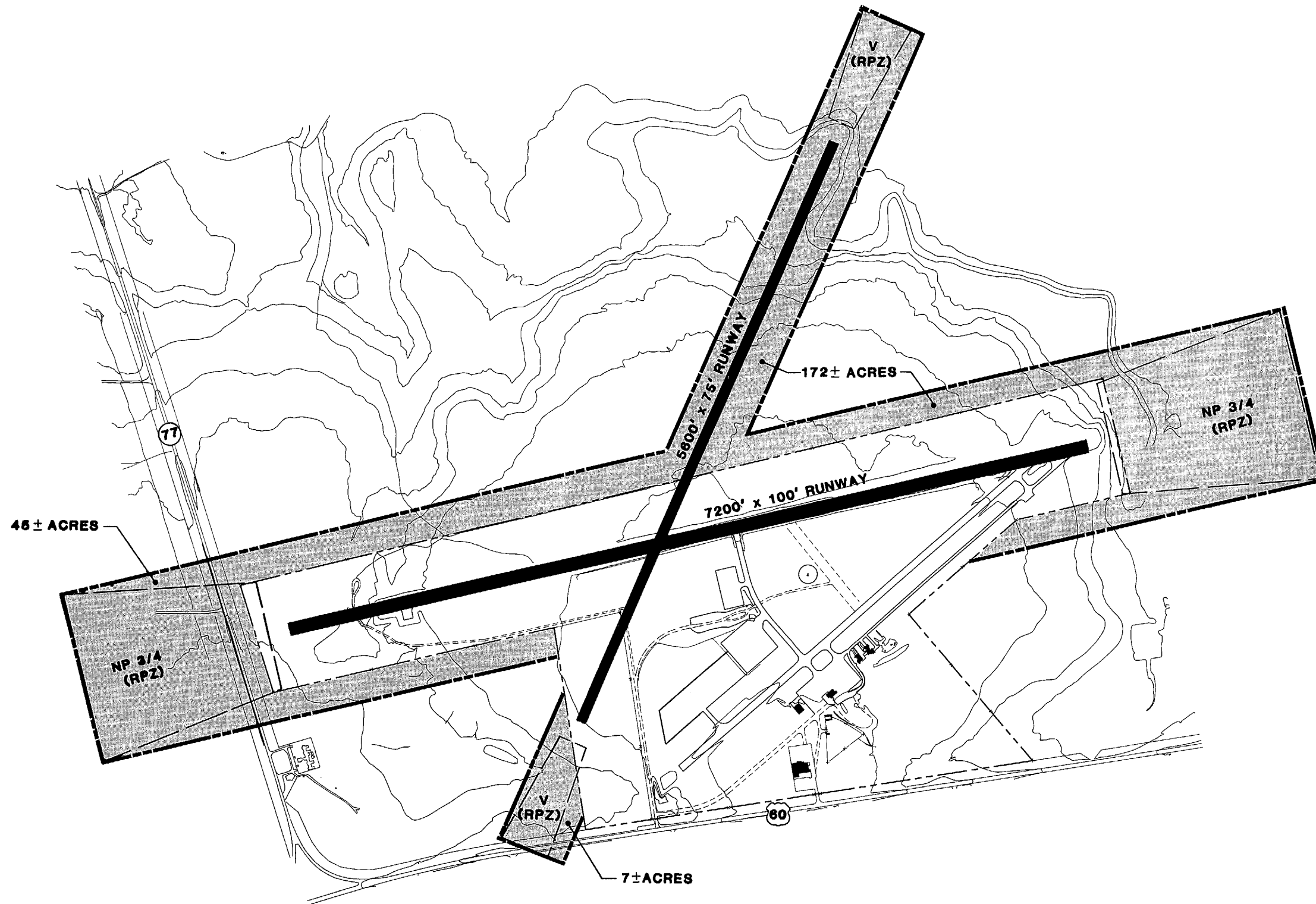
The development of a parallel taxiway for Runway 1-19 would require the relocation of the existing entrance road to provide the necessary clearance and safety area. In addition, there would be little usable area left between the taxiway and the west end of the existing center apron for terminal facilities. This landside layout would provide no runway or taxiway frontage on Runway 1-19, thereby limiting access to the airside facilities and potentially creating congestion on parallel taxiway for Runway 6-24.

The existing terminal layout is least suited for this alternative since the majority of facilities are aligned with Runway 3-21. In this alternative access to the proposed runways from the center and south parking aprons is the most distant and least direct. This inefficient layout could be improved by redeveloping the center apron. The center apron could be moved adjacent to the proposed parallel taxiway for Runway 6-24 and east of Taxiway 1. Public vehicle access could not be provided to this area without closing the portion of Taxiway 1 that would be located south of the access road.





Locating the FBO facilities adjacent to the center apron would increase the convenience of these facilities and services to local pilots. The north apron would primarily be used for commuter airline gate positions and larger transient aircraft. The center apron would not be designed to support the heavier aircraft and would be used primarily by local aircraft and by smaller transient aircraft. The south apron would be abandoned and could ultimately be redeveloped for aviation related business development.

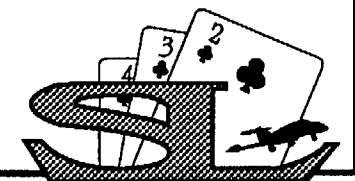
The airport traffic patterns and aircraft noise considerations of this alternative offer both advantages and disadvantages. The traffic





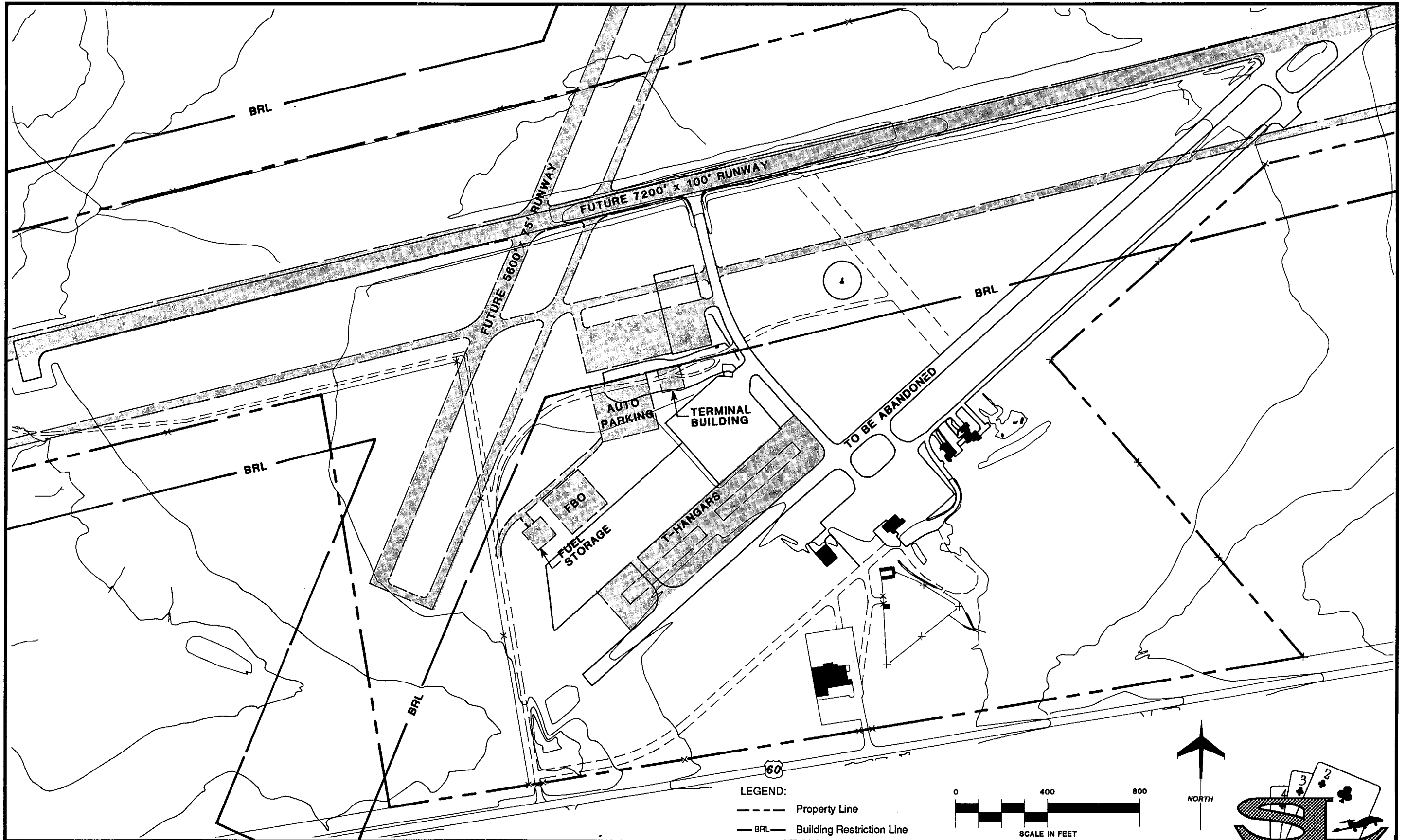
LEGEND:

-  Property Aquisition
-  Runway Protection Zone (RPZ)
-  Visual Approach
-  Non-Precision Instrument Approach – Visibility minimums as low as 3/4mile

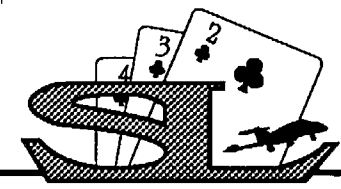
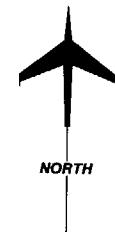
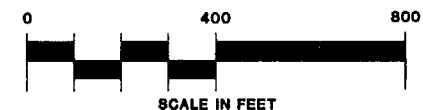


**Show Low**  
MUNICIPAL AIRPORT





LEGEND:  
----- Property Line  
——— BRL ——— Building Restriction Line



**Show Low**  
MUNICIPAL AIRPORT

patterns for Runway 1-19 would be on the east side of the runway to both thresholds. The existing NDB-A instrument approach procedure would be aligned within seven degrees of the final approach course for Runway 1-19 and could enable straight-in approach minimums to be established for the procedure. The disadvantage to this runway orientation is that it directs straight out departures from Runway 19 more directly over existing residential areas than that of the Runway 13-31 orientation of Alternative B. However this still represents an improvement over the straight out departures from Runway 21 in Alternative A.

The costs of developing Alternative C would be less than Alternative B since the crosswind can be constructed without substantial earth fill requirements. There will be additional costs for land acquisition that were not part of Alternative B. One additional cost associated with Alternative C would be the relocation of the NDB radio beacon which would be within the Runway Safety Area of Runway 1-19.

#### Alternative D

Alternative D seeks to maximize the length of the primary runway and crosswind coverage of the runway system. Two new runways would be constructed and the existing runways would be abandoned. In this alternative the existing landside facilities would be of little value and would need to be completely redeveloped. Exhibit 5G illustrates the runway development associated with Alternative D.

Examination of the topographic mapping that was performed as part of this Master Plan indicates that it may be feasible to provide up to 8,000 feet of runway length and maintain grade limitations. However, the only direction that this runway could be constructed would be on a true bearing of 105/285 degrees (Runway 9-27). Runway 9-27, like Runway 6-

24, could not provide adequate Runway Safety Areas due to excessive grades off the runway ends and would require displaced thresholds. The displaced thresholds would serve to reduce the landing length available in that direction but would not reduce the takeoff length available in either direction.

Although the runway end elevations on Runway 1-19 could meet grade limitations, there is a small valley that would need to be filled with earth in order to construct the proposed runway and taxiway. This valley is approximately 20 feet below runway grade and would require approximately 25 percent more fill material than the extension of Runway 6-24.

Runway 9-27 would be oriented more than 80 degrees divergent to the prevailing wind direction and consequently would provide less wind coverage than Runway 6-24. The same crosswind runway (Runway 1-19) of Alternative C would be constructed for this alternative to compensate for the decreased wind coverage provided by Runway 9-27. Runway 9-27 alone provides wind coverage of 85.3 and 88.5 percent for 12 m.p.h. and 15 m.p.h. crosswinds respectively. The two runways proposed in this alternative provide a combined wind coverage of 96.9 percent for 12 m.p.h. crosswinds and 98.4 percent for 15 m.p.h. crosswinds.

This alternative will require the acquisition of at least 346 acres of land in four directions from the existing airport property. The land needed for this alternative is almost exclusively U.S. Forest Service administered land. It may be possible to trade surplus airport property not needed for this alternative to reduce the overall land acquisition costs. This potential cost saving has not been factored into the land acquisition cost estimates of any of the alternatives. Again, the land (53 acres) on the west side of Highway 77 needed for Runway Protection Zone could possibly be

secured by means of an aviation easement and zoning regulations.

With the development of the two new runways, a majority of the existing landside development would be located within the Runway Safety Area and could not be used. The remaining facilities would be rendered nonfunctional or inefficient and would interfere with the landside redevelopment necessary to support the proposed airside development. With a new airside configuration an optimum landside development pattern should also be established. The proposed landside development associated with Alternative D is illustrated in Exhibit 5H.

Redeveloping all of the required landside facilities offers an opportunity to provide a modern, fully functional, efficient, and convenient terminal area. The terminal building will form the focal point of the terminal area. This building can house both airline and general aviation facilities and services. This layout also provides a separation of the transient and larger local aircraft in the vicinity of the FBO while a majority of the smaller local aircraft will be stored in the T-hangar facilities adjacent Runway 1-19.

All of the terminal facilities are aligned with the runway that will be most readily used by the respective class of aircraft. The small local aircraft would be located nearer the utility runway and the airline and transient facilities would be located nearer with the transport runway. This configuration produces a smooth transition between the types of activity and provides the most direct access from the terminal area to the runways. The landside development begins at the intersection of the runways and extends in both directions. There is ample area for future terminal expansion, particularly to the east. With this runway configuration there is approximately 105 acres available for landside

facilities or other aviation related development. As with Alternative C the area designated for industrial development in the previous Master Plan is almost completely used for the development of Runway 1-19.

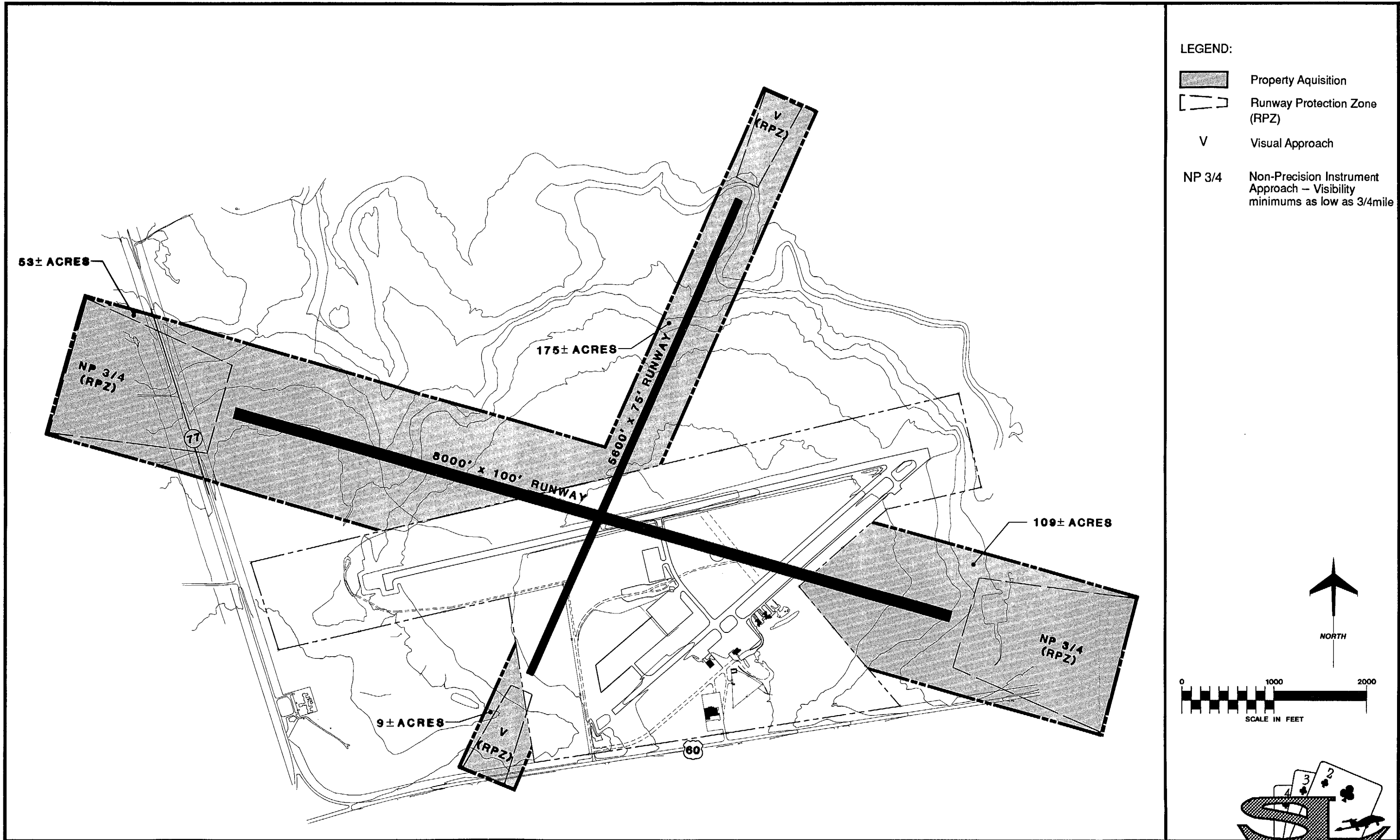
The new aircraft traffic patterns that would be established for this alternative are not much different from Alternative A. The traffic pattern for Runway 9-27 would be on the north side of the runway and the pattern for Runway 1-19 would be on the east side of the runway. These new traffic patterns would, however, reduce the overflights over the existing residential areas.

Alternative D essentially builds a new airport at the existing airport site. Therefore, the development costs of Alternative D will be the greatest of all alternatives. Alternative D produces the most capable airport for Show Low, however, the development costs and other factors may make this an undesirable alternative. The sacrifice of the existing airside and landside facilities also can not be ignored. The majority of existing facilities are in good condition and could be used for years to come.




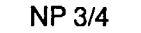
## SUMMARY

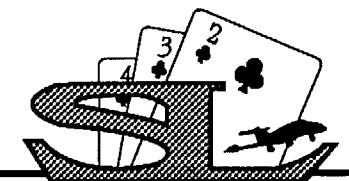
The four airport development alternatives have examined the full spectrum of possible development, from maximum use of existing facilities to essentially starting over and developing new airside and landside facilities. These four alternatives are not all inclusive, however, and other possibilities do exist within the two extremes. Minor adjustments in runway orientation, runway length or landside development may be necessary or desirable as the selected alternative is refined.

Due to the trade-offs between development cost and airport capabilities associated with these alternatives, the direct comparison of the four alternatives is a subjective and

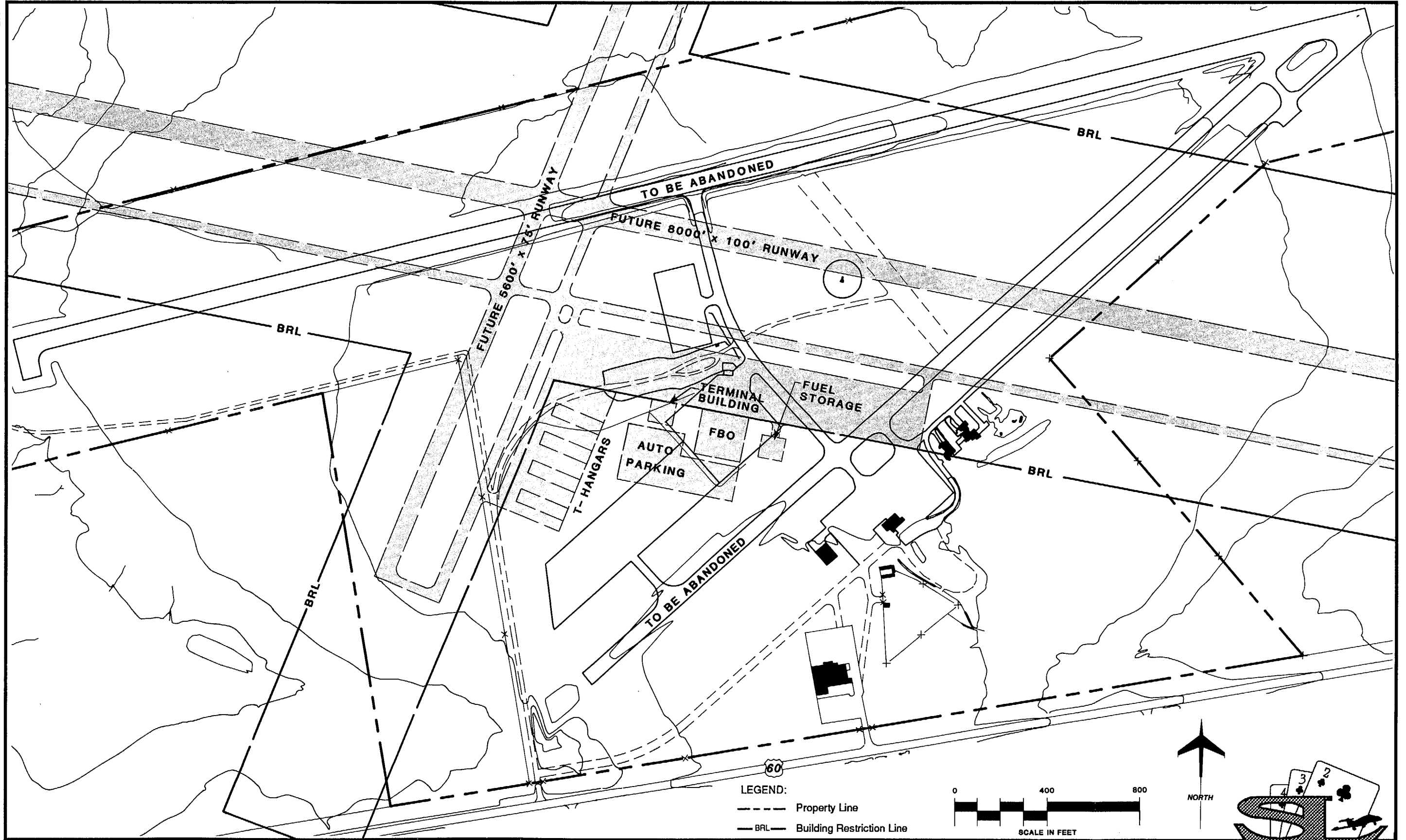


LEGEND:

-  Property Aquisition
-  Runway Protection Zone (RPZ)
-  Visual Approach
-  Non-Precision Instrument Approach – Visibility minimums as low as 3/4mile



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difficult task. It is clear that as one objective is achieved another is lost. The evaluation criteria discussed in the foregoing pages are primarily subjective and qualitative criteria, and subject to interpretation and value judgments. The advantages and disadvantages of each alternative were discussed and evaluated on a basis believed to provide the greatest potential benefit to Show Low Municipal Airport.

In addition to the qualitative analysis of the development alternatives, it is important to consider the quantitative aspects of the alternatives. The quantitative analysis deals primarily with the development costs or other numeric parameters that are unique or materially different from the other alternatives. Table 5A was developed in order to facilitate comparison of the quantitative factors for each alternative.

**Table 5A**  
**Comparison of Alternatives**  
**Show Low Municipal Airport**

<u>Development Characteristic</u>	<u>Alternative A</u>	<u>Alternative B</u>	<u>Alternative C</u>	<u>Alternative D</u>
Land Acquisition (ac)	164	218	224	346
Terminal Area Available (ac)	80	123	132	105
Crosswind Coverage (12/15%)	90.7/93.7	91.9/95.1	95.7/97.5	96.9/98.4
Industrial Area Available (ac)	30	34	10	10
<u>Development Item</u>				
Extend Runway 6-24	125,000	125,000	125,000	N/A
Widen Runway 6-24	300,000	300,000	300,000	N/A
Strengthen Runway 6-24	800,000	800,000	800,000	N/A
Earth Fill (Rwy 6-24)	1,140,700	1,140,700	1,140,700	N/A
Earth Fill (Rwy 13-31)	N/A	666,700	N/A	N/A
Earth Fill (Rwy 1-19)	N/A	N/A	100,000	100,000
Earth Fill (Rwy 9-27)	N/A	N/A	N/A	1,426,000
Relocate NDB	N/A	N/A	10,000	10,000
Construct Runway 13-31	N/A	700,000	N/A	N/A
Construct Runway 1-19	N/A	N/A	700,000	700,000
Expand North Apron	194,400	333,300	222,200	N/A
Construct Runway 9-27	N/A	N/A	N/A	2,225,000
MIRL Runway 9-27	N/A	N/A	N/A	240,000
REIL Runway 9-27	N/A	N/A	N/A	50,000
PAPI Runway 9-27	N/A	N/A	N/A	50,000
Extend MIRL Runway 6-24	30,000	30,000	30,000	N/A
Relocate REIL Runway 6-24	20,000	20,000	20,000	N/A
Land Acquisition	820,000	1,090,000	1,120,000	1,730,000
Construct Taxiway 13-31	N/A	355,800	N/A	N/A
Construct Taxiway 1-19	N/A	N/A	355,800	355,800
Construct Taxiway 9-27	N/A	N/A	N/A	885,600
Extend Taxiway 2	93,500	N/A	N/A	N/A
Construct Taxiway 6-24	700,000	700,000	700,000	N/A
Construct New Apron	N/A	N/A	N/A	986,700
Construct T-hangar Apron	<u>102,000</u>	<u>122,500</u>	<u>128,500</u>	<u>87,500</u>
<b>Total Costs</b>	<b>\$4,325,600</b>	<b>\$6,384,000</b>	<b>\$5,752,200</b>	<b>\$8,846,600</b>

The future development of Show Low Municipal Airport should be agreed upon, not only by those who administer and use the airport, but also by those who may be affected by its operation. Therefore, the final decision on which development alternative the airport should follow will be made within the community. Never-the-less, based on the factors of airfield development cost, airport capability to accommodate the types of aircraft expected, crosswind coverage provided by the runway system, and the resulting operational efficiency of the airport, it is the recommendation of the consultant that Alternative C be selected for the long term development of Show Low Municipal Airport.

Alternative C is capable of providing the recommended runway length of 7,200 feet without incurring unnecessary expense. It

increases the crosswind coverage provided by the runway system to acceptable standards, and retains the use of almost all existing landside development. The future industrial development area is heavily impacted by Alternative C, however, the potential for aircraft noise conflicts is reduced.

There are a great number of considerations and requirements regarding airport development that are common to all alternatives and have not been discussed. These considerations will be addressed and incorporated into the refinement of the selected airport development alternative. This refinement will evolve into the recommended Airport Layout Plan (ALP) which will illustrate the ultimate development of Show Low Municipal Airport.